

A review of 0.5 degree global hourly air temperature datasets

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Our global 0.5° hourly T data

We have developed global 0.5°x0.5°, hourly land surface air temperature data sets by merging the in situ data (CRU) with various reanalyses (MERRA, ERA-Int, ERA-40, NCEP) (**Wang and Zeng, 2013**).

Our value-added data sets have exactly the same monthly mean values of daily maximum (Tx) and minimum (Tn) temperatures as those from CRU.

rda.ucar.edu/datasets/ds193.0/.index.html



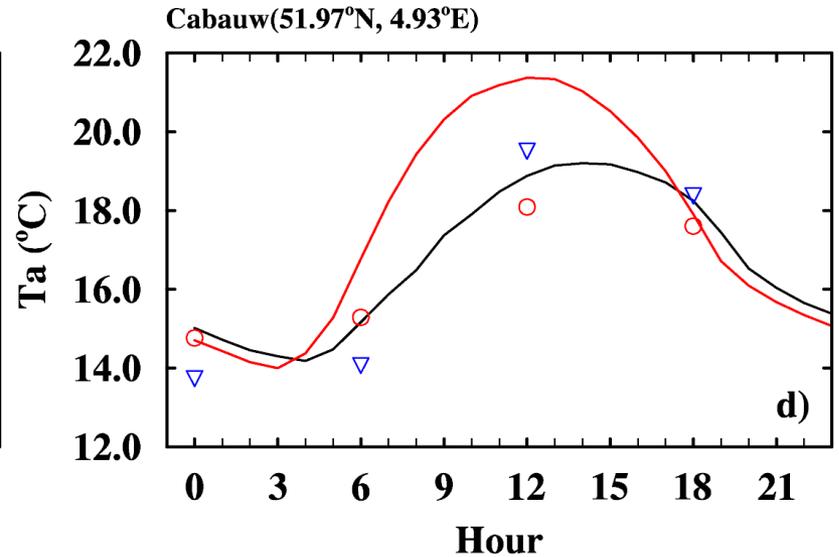
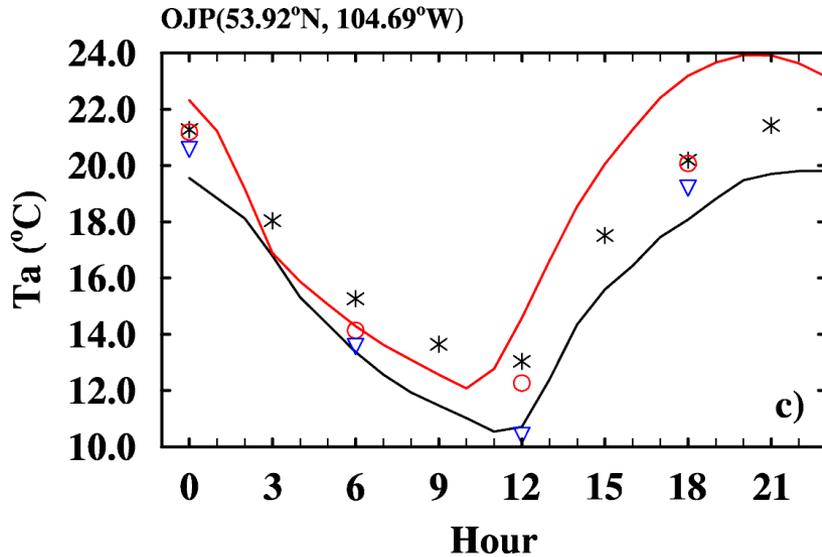
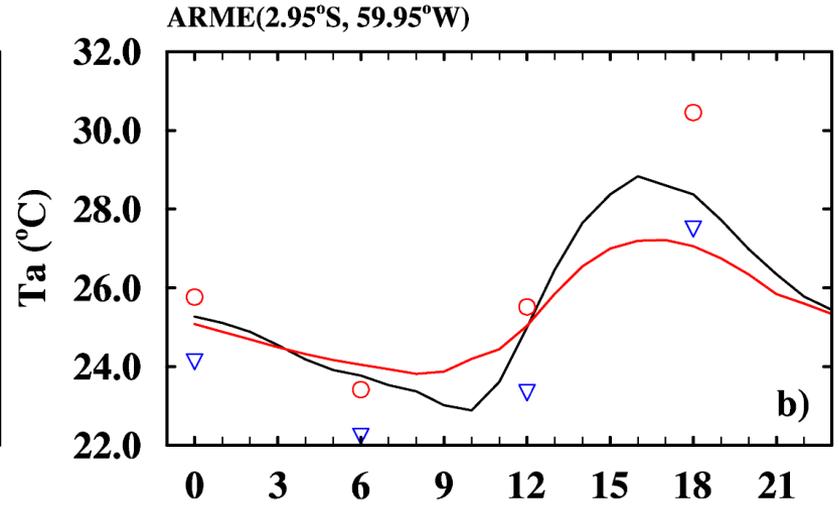
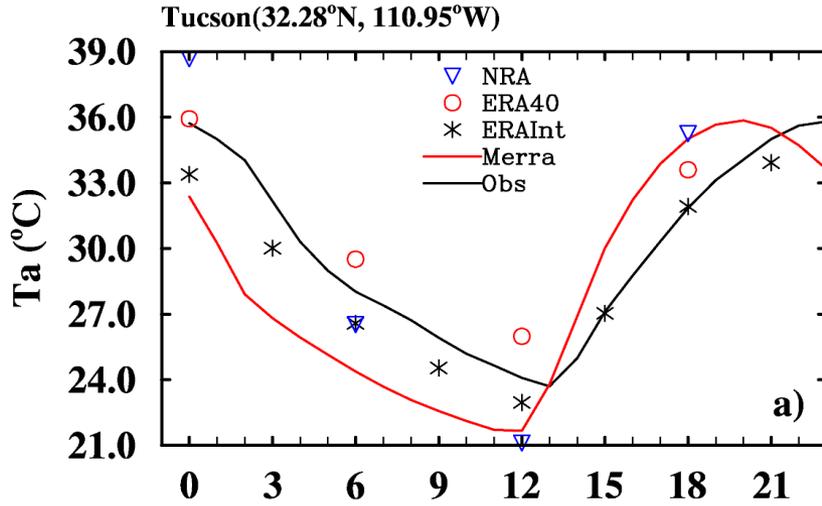
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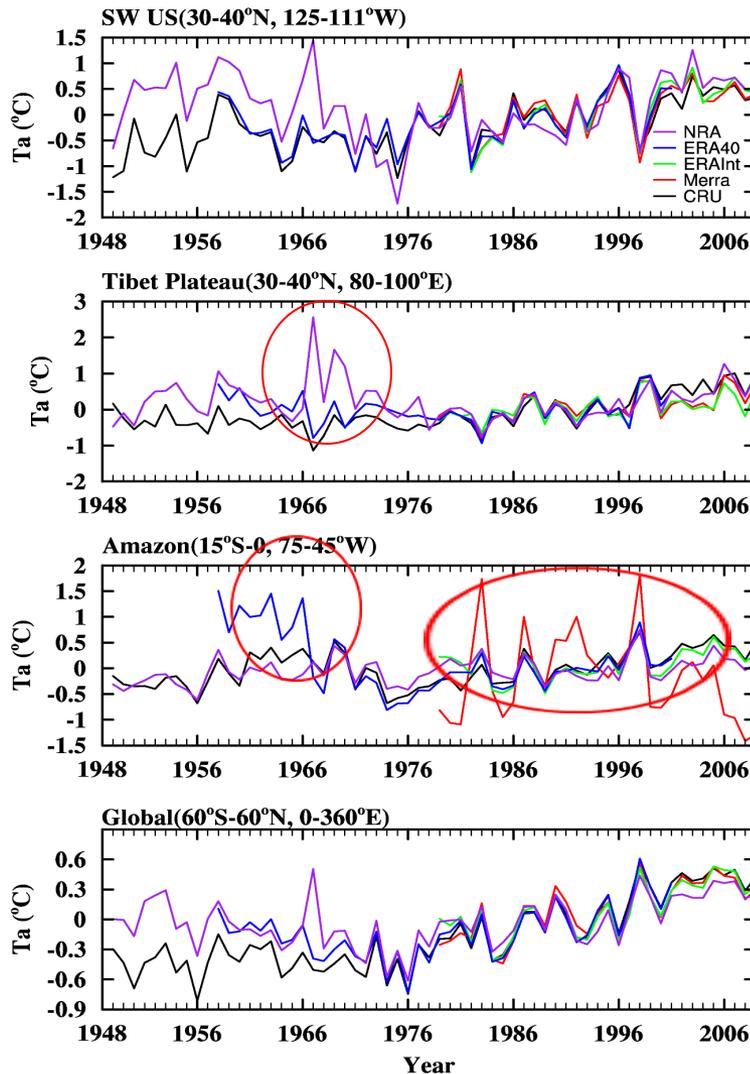
Reanalysis Ta vs. point measurements in July

Monthly diurnal cycle

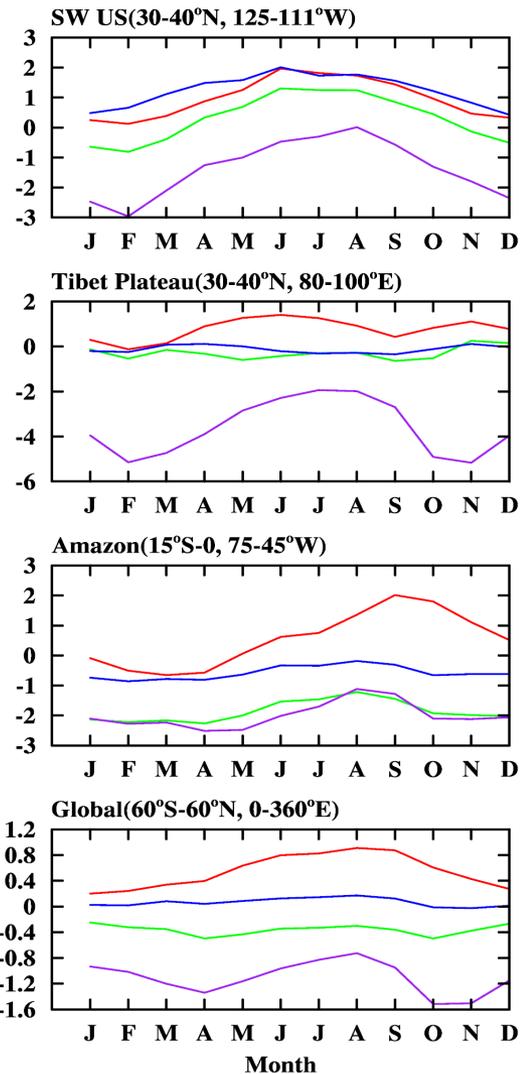


How realistic and consistent are reanalysis Ta?

anomalies



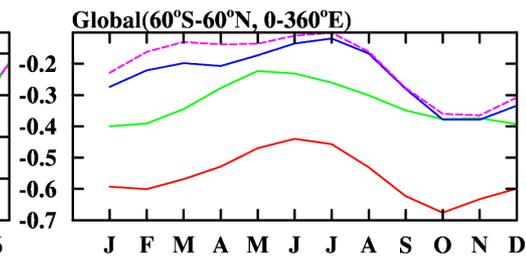
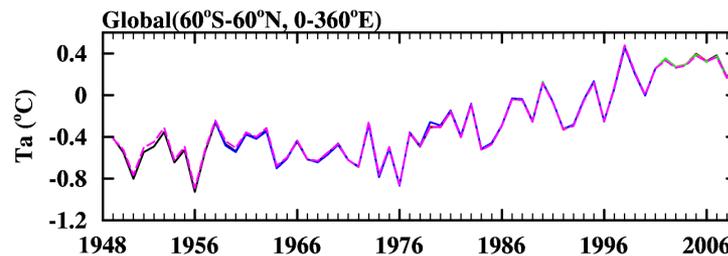
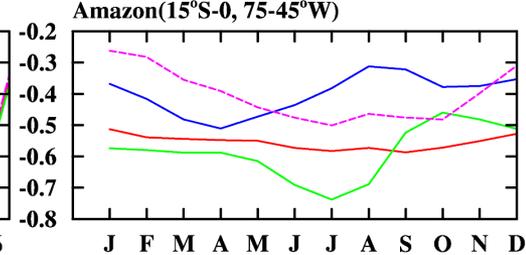
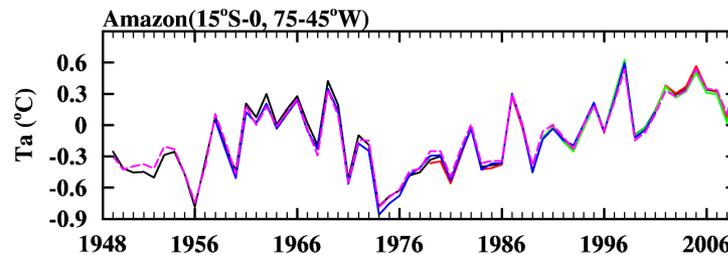
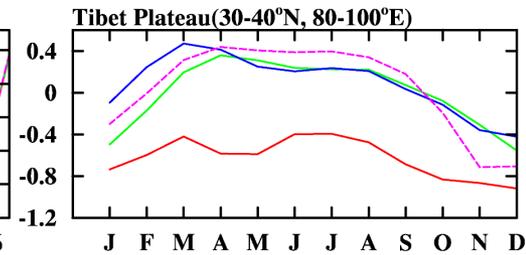
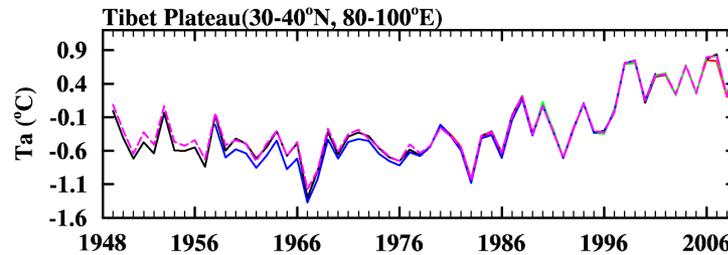
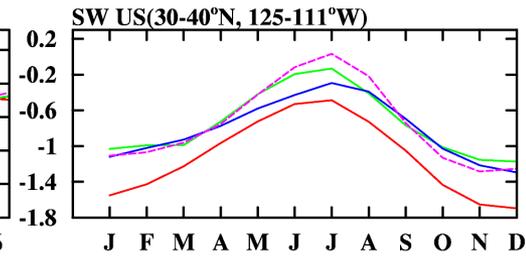
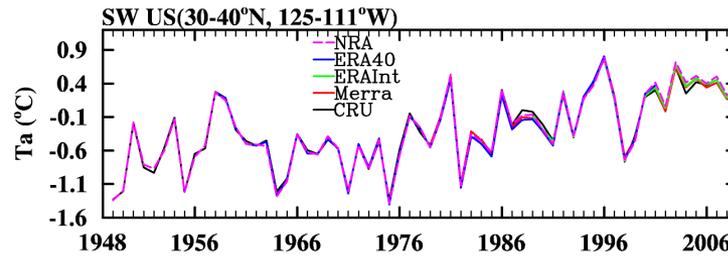
reanalysis - CRU



After our adjustment using CRU data

Anomalies

Clim. Diff.



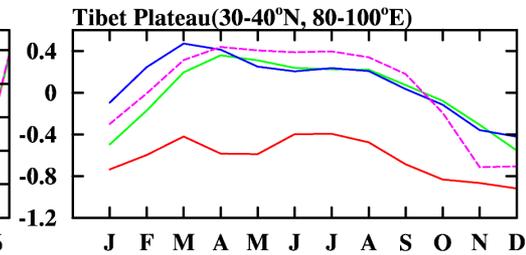
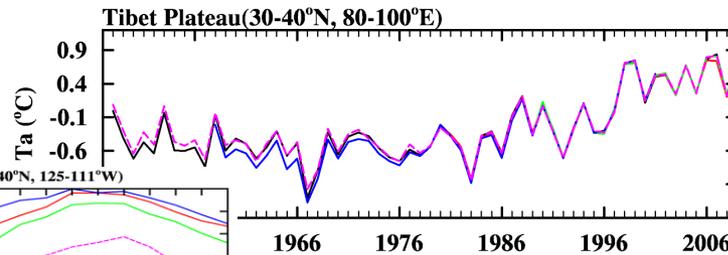
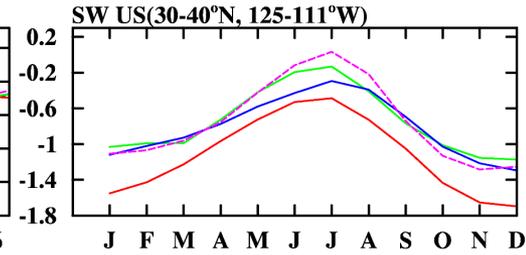
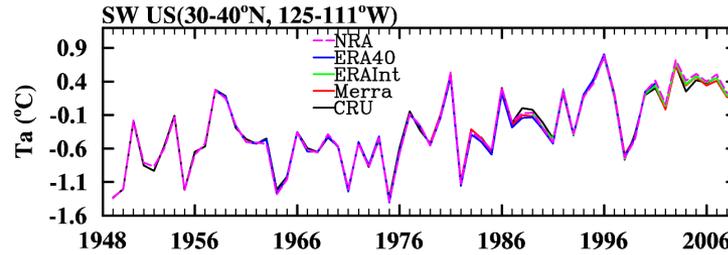
Original reanalysis

Each adjusted reanalysis gives exactly the same Tmax, Tmin, (and Tm) as CRU data

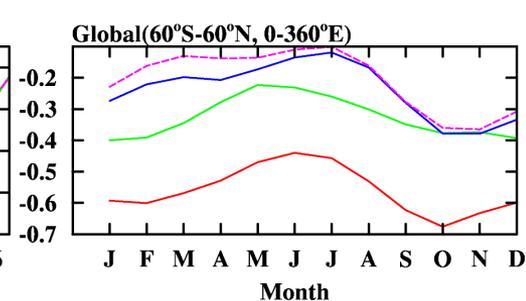
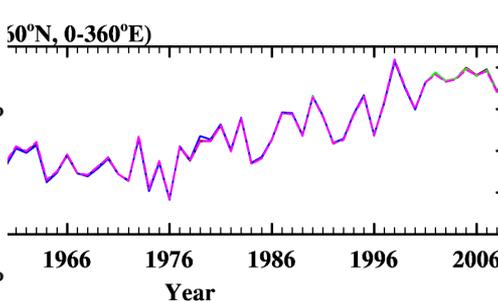
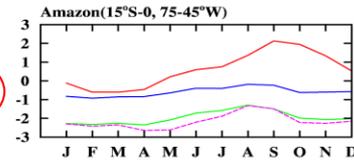
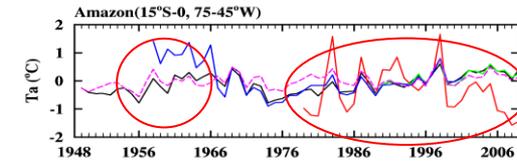
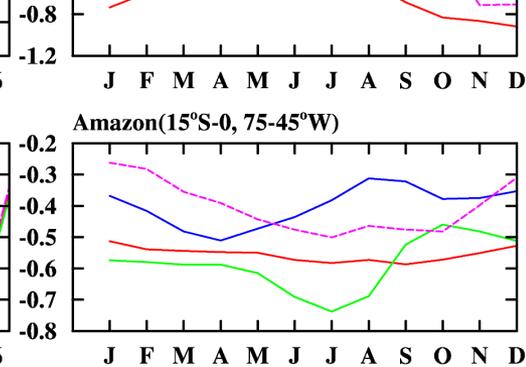
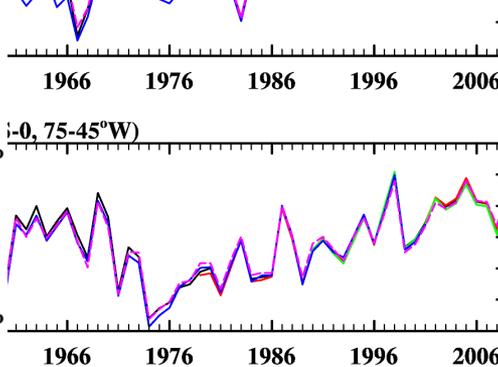
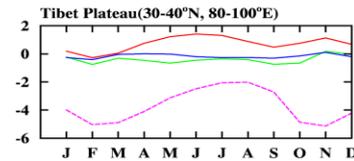
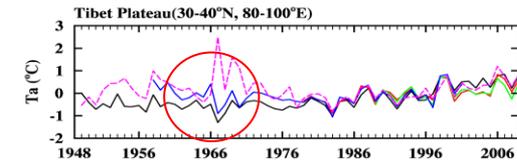
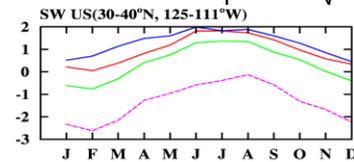
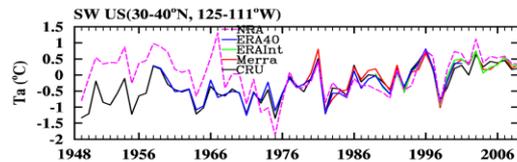
After our adjustment using CRU data

Anomalies

Clim. Diff.

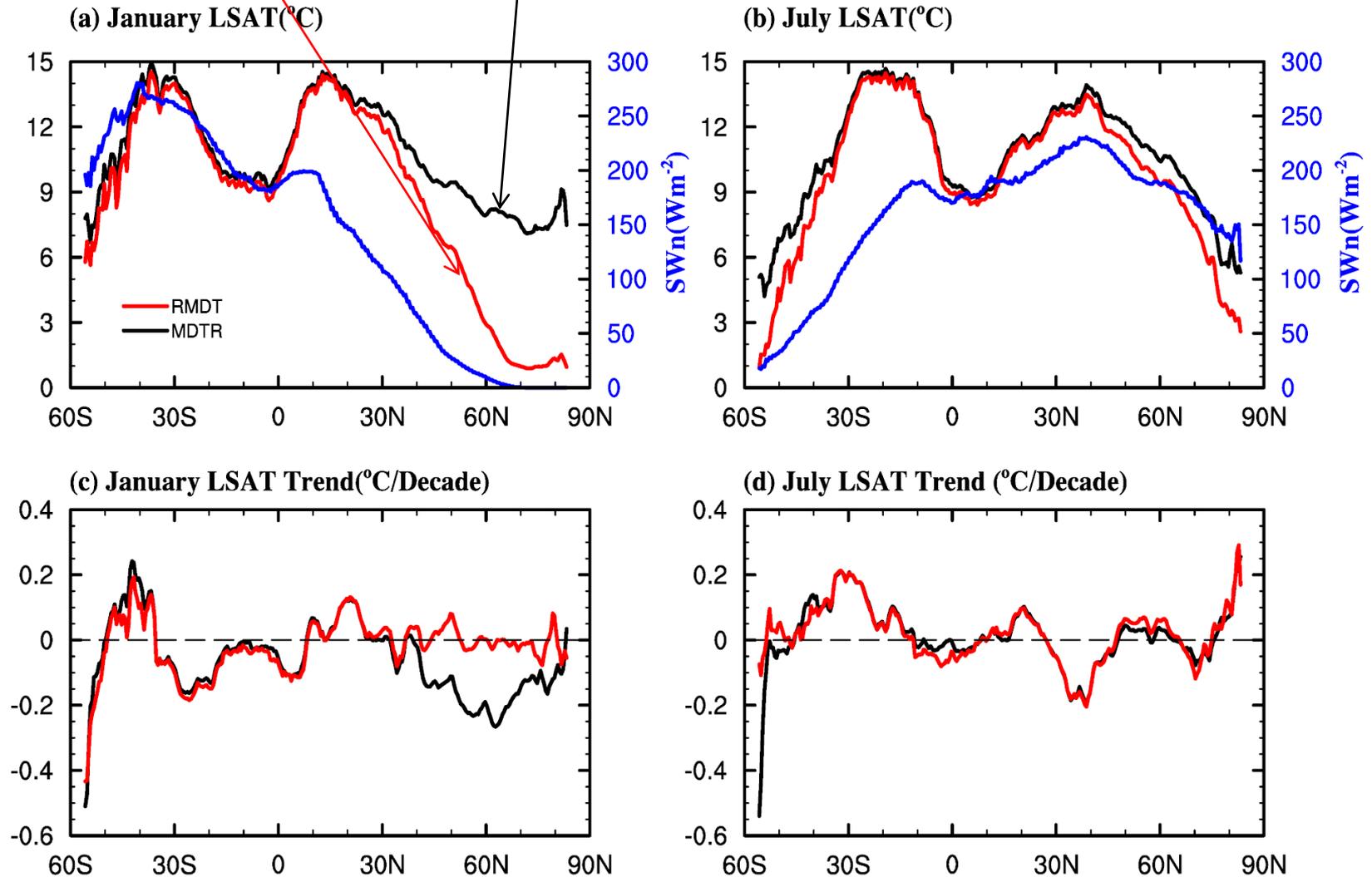


Original reanalysis



MDTR (based on daily Tx and Tn)

RMDT (based on monthly-averaged diurnal cycle)



Suggestion on the next NLDAS Ta forcing data

- Using the same methodology in Wang and Zeng (2013) to develop hourly land surface air temperature data for the NLDAS domain
- Consider using multiple forcing to drive LSMs, as the dispersion may be as large as that from multiple models with the same forcing

Wang, A. and X. Zeng, 2013: Development of Global Hourly 0.5° Land Surface Air Temperature Datasets. *J. Climate*, 26, 7676–7691.

doi: <http://dx.doi.org/10.1175/JCLI-D-12-00682.1>

Data available: <http://rda.ucar.edu/datasets/ds193.0/>